

54447

ANALYTICAL REPORT

Prepared by
Roy F. Weston, Inc.

National Lead Industries
Pedricktown, NJ

EPA Work Assignment # 2-476
Project # 3347-21-01-3476
EPA Contract # 68-03-3482

ANALYTICAL REPORT

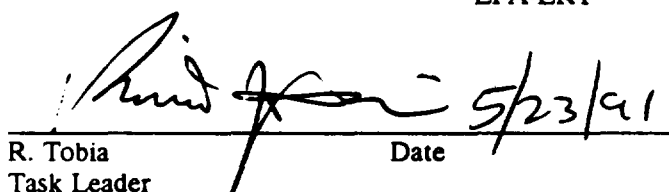
Prepared by
Roy F. Weston, Inc.

National Lead Industries
Pedricktown, NJ

May 22, 1991

EPA Work Assignment No. 2-476
Project No. 3347-21-01-3476
EPA Contract No. 68-03-3482

Submitted to
A. Zownir
EPA-ERT


R. Tobia
Task Leader

Date

Analysis by
REAC, Galbraith, & ATEC


V. Kansal
S. & A. Section Chief

Date

Prepared by:
J. Hunter


W. S. Butterfield
Project Manager

Date

Reviewed by:
Yi-Hua Lin

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Appendices will be furnished on request.

INTRODUCTION

REAC Laboratory, in response to EPA work assignment 3347-21-01-3476, provided analytical and related services for samples received from the National Lead Industries site on February 19-20, 1991. These services included the following;

- 1) The analysis of six soil samples by the REAC laboratory for aluminum, antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, magnesium, manganese, mercury, nickel, selenium, silver, and zinc.
- 2) The subcontracting of six soil samples for Hardgrove Grindability Index, pH, grain size, cation exchange capacity, and bulk density analyses to ATEC Environmental Consultants.
- 3) The subcontracting of six soil samples to Galbraith Laboratories for TCLP extraction and analysis for arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver.

CASE NARRATIVE

REAC personnel calculated the percent recovery for the lead matrix spike for the TCLP metals analysis to be 57. The laboratory had reported 98 percent, subsequent discussion with the subcontractor revealed that the value had been incorrectly reported and the corrected value is contained in this report.

TCLP extraction and analysis of extracts were initially completed by the subcontracting laboratory employing a single point calibration and the method of standard additions to analyze the extracts. The results for this initial analysis of the TCLP extracts were deemed unsatisfactory and reanalysis was performed using a three point calibration. The results of the reanalysis of the TCLP extracts are presented in Table 1.4. Also, the reanalysis for the mercury occurred after the holding time had expired, however, mercury was not detected in the original analysis or in the reanalysis and the data should not be affected.

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ANALYTICAL PROCEDURE FOR METALS IN SOIL

Approximately one gram of sample, weighed to 0.01 g accuracy, was thoroughly mixed with 10 ml 1:1 nitric acid:water, digested and analyzed according to methods contained in Test Methods for Evaluating Solid Wastes, USEPA, SW-846, September, 1987. The results are listed in Table 1.1.

Mercury was analyzed separately on a Varian SpectrAA-300 Atomic Absorption Spectrophotometer equipped with a Varian VGA-76 vapor gas analyzer using method 7471 as given by Test Methods for Evaluating Solid Waste, USEPA, SW-846, September, 1986.

Results of the analyses are listed in Table 1.1.

ANALYTICAL PROCEDURES

Methods for the TCLP and miscellaneous analyses are found in the following references.

Bulk Density was performed using Method D854/E12 American Society for Testing and Materials Results for Bulk Density are presented in Table 1.3.

Cation Exchange Capacity was performed using Method 9080, Test Methods for the Analysis of Solid Waste (SW-846), USEPA 3rd Edition, November 1986. Results for Cation Exchange Capacity are presented in Table 1.3.

Grain Size Analysis was performed using Method 422, American Society for Testing and Materials. The results of the Grain Size Analysis are presented in Figure 1.1.

Hardgrove Grindability Index was performed according to Method D409 American Society for Testing and Materials. Results for the Hardgrove Grindability Index are presented in Table 1.3.

TCLP methodology as described in 40 CFR, Part 261, Appendix II, Method 1311 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Vol. 1C, Revision 0, November, 1990. Results for Metals Analysis of TCLP Extracts are presented in Table 1.2.

pH was performed using Method 9010, Test Methods for the Analysis of Solid Waste (SW-846), USEPA 3rd Edition, November 1986. Results for pH are presented in Table 1.3.

00003

Table 1.1

Results of the Metals Analysis

WA# 3476 NATIONAL LEAD IND. SOIL SAMPLES

Concentration reported in mg/kg

Client #	808794	808795	808796	808797	808798	808799	
Location:	Lead	Lead	A Pile	B Pile	C Pile	D Pile	
	Oxide A	Oxide B					
% Solids	88.0	97.1	99.3	88.4	93.2	74.4	
Parameter:							DETECTION LIMIT
Aluminum	1400	800	94000	8700	11000	12000	50
Antimony	970	2500	12000	1100	400	300	1
Arsenic	400	690	1000	1600	1400	1200	1
Barium	770	40	800	650	1400	1300	2.5
Cadmium	1000	800	300	50	350	260	2.5
Chromium	100	110	160	200	150	130	5
Copper	630	2400	31000	2750	2500	3060	5
Iron	12000	15000	130000	100000	110000	130000	10
Lead	480000	350000	130000	120000	130000	110000	50
Magnesium	780	860	19000	2000	1500	2040	5
Manganese	300	50	480	640	1100	1100	5
Mercury	2.10	2.60	0.02	0.10	0.02	ND	0.02
Nickel	380	630	640	890	470	800	5
Selenium	ND	ND	1	5	1	2	0.5
Silver	8	11	6	6	4	6	2.5
Zinc	1120	4000	40000	3500	3050	5570	2.5

ND denotes not detected

00004

Table 1.2

Results of the Metals Analysis

of TCLP extracts

WA# 3476 NATIONAL LEAD IND. SOIL SAMPLES

Concentration reported in mg/L

Client #	C8794	C8795	C8796	C8797	C8798	C8799	Method
Location:	Lead	Lead	A Pile	B Pile	C Pile	D Pile	Detection
	Oxide A	Oxide B					Limit
Parameter:							
Arsenic	ND	0.282	ND	ND	ND	ND	0.10
Barium	ND	0.199	ND	ND	ND	ND	0.10
Cadmium	24.1	26.3	1.4	1.6	5.3	0.69	0.10
Chromium	ND	ND	ND	ND	ND	ND	0.10
Lead	620	2750	8.0	4.9	5.1	4.5	0.10
Mercury	ND	ND	ND	ND	ND	ND	0.10
Selenium	ND	ND	ND	ND	ND	ND	0.10
Silver	ND	ND	ND	ND	ND	ND	0.10

ND denotes not detected

00005

Table 1.3 Results of Hardgrove Grindability Index, Bulk Density
pH, and Cation Exchange Capacity

WA # 3476 National Lead Industries

Sample ID	Location	pH	Cation Exchange Capacity (meq/100g)
=====			
8794	Lead Oxide A	9.7	2.2
8795	Lead Oxide B	6.8	5.7
8796	Pile A	4.4	12.1
8797	Pile B	7.4	8.3
8797 Dup	Pile B	7.3	8.3
8798	Pile C	7.1	6.5
8799	Pile D	7.6	17.0
=====			

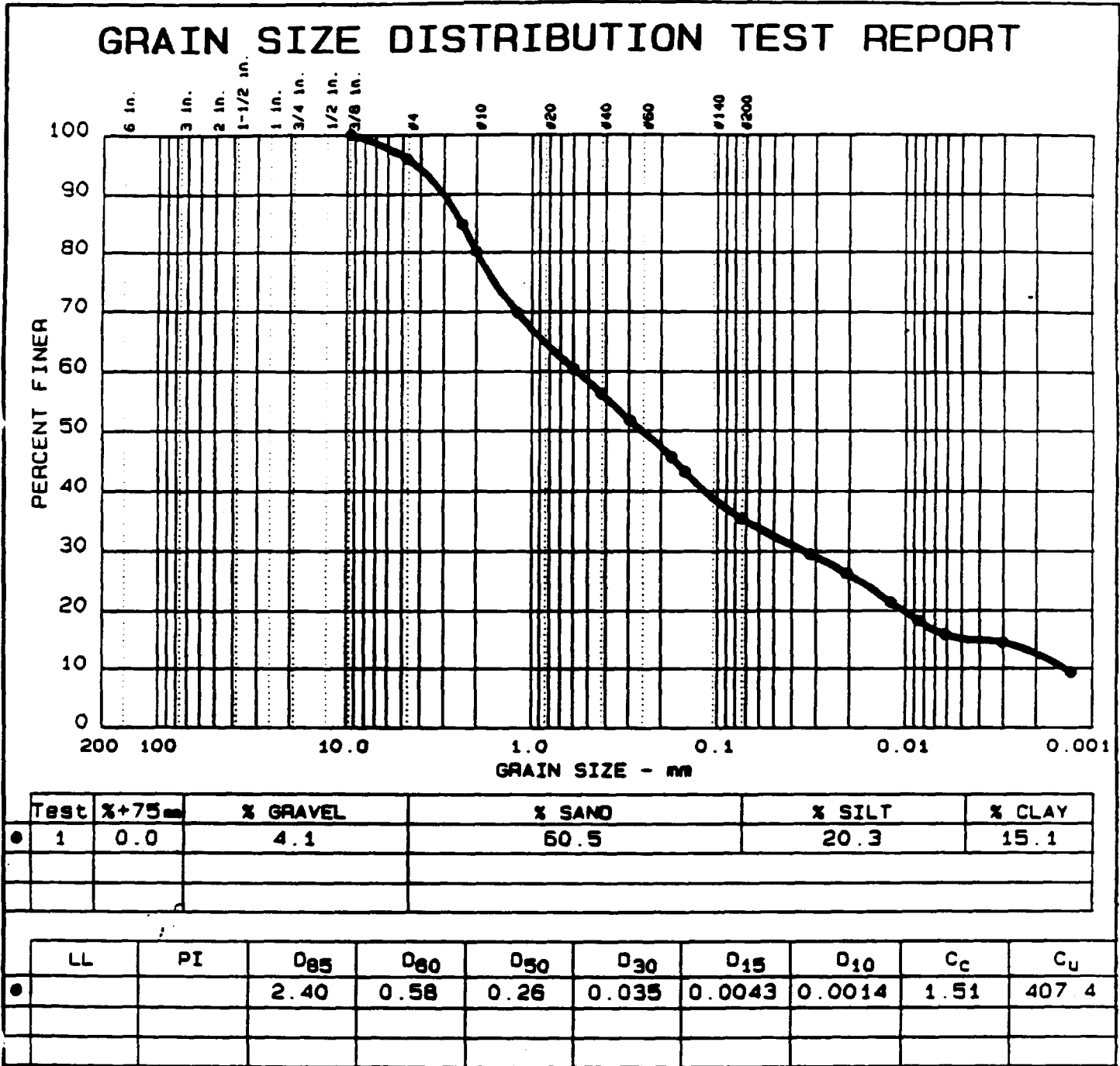
Sample ID	Location	Hardgrove Grindability Index	Bulk Density (mg/L)
=====			
8794	Lead Oxide A	109	3.31
8795	Lead Oxide B	122	3.02
8796	Pile A	103	2.44
8797	Pile B	108	2.22
8797 Dup	Pile B	109	2.26
8798	Pile C	121	2.35
8799	Pile D	122	2.47
=====			

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Figure 1.1

Lead Oxide A

National Lead Industries, WA # 3476

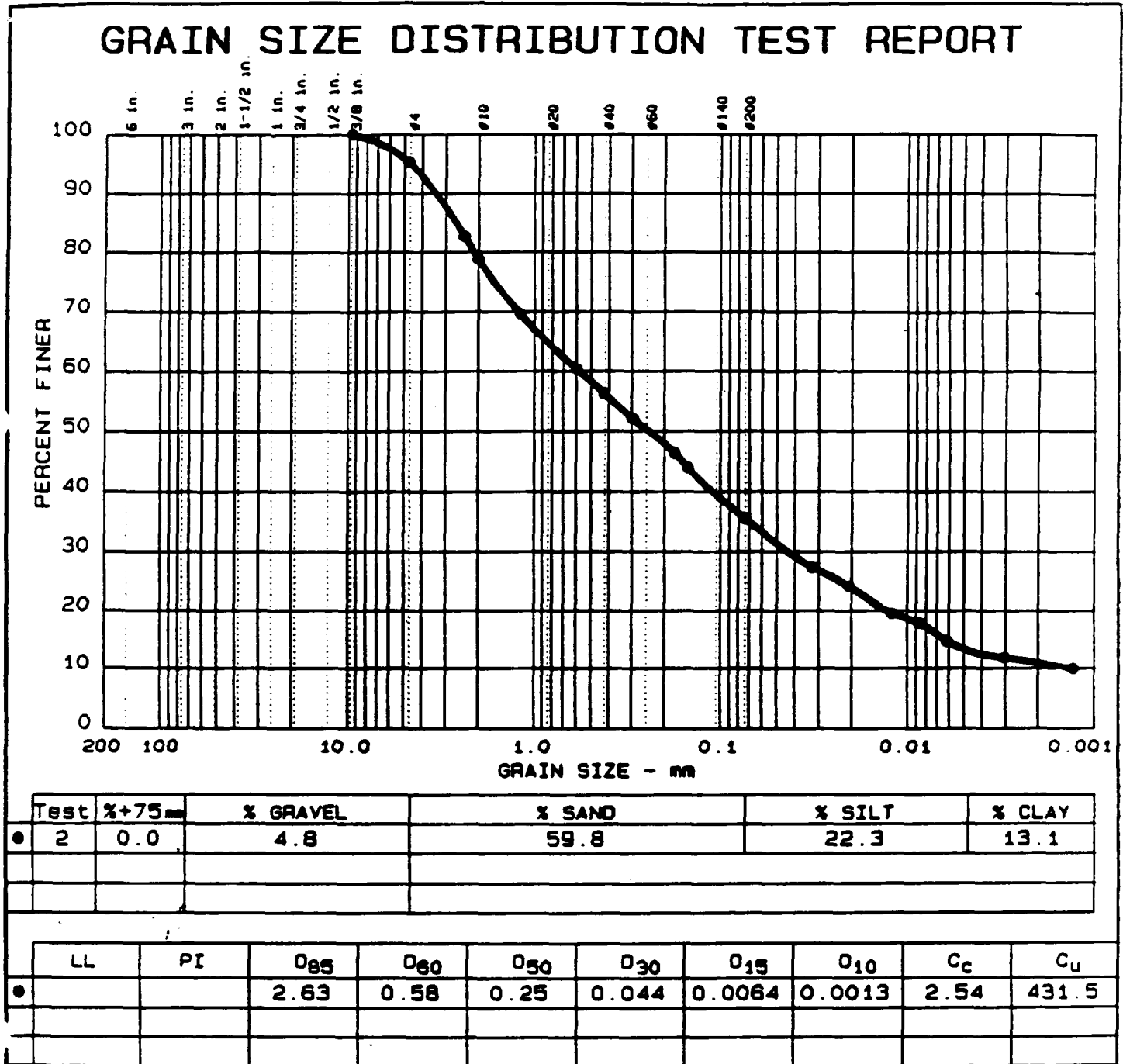


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Figure 1.1

Lead Oxide B

National Lead Industries, WA # 3476



000098

Figure 1.1

Pile A

National Lead Industries, WA # 3476

GRAIN SIZE DISTRIBUTION TEST REPORT

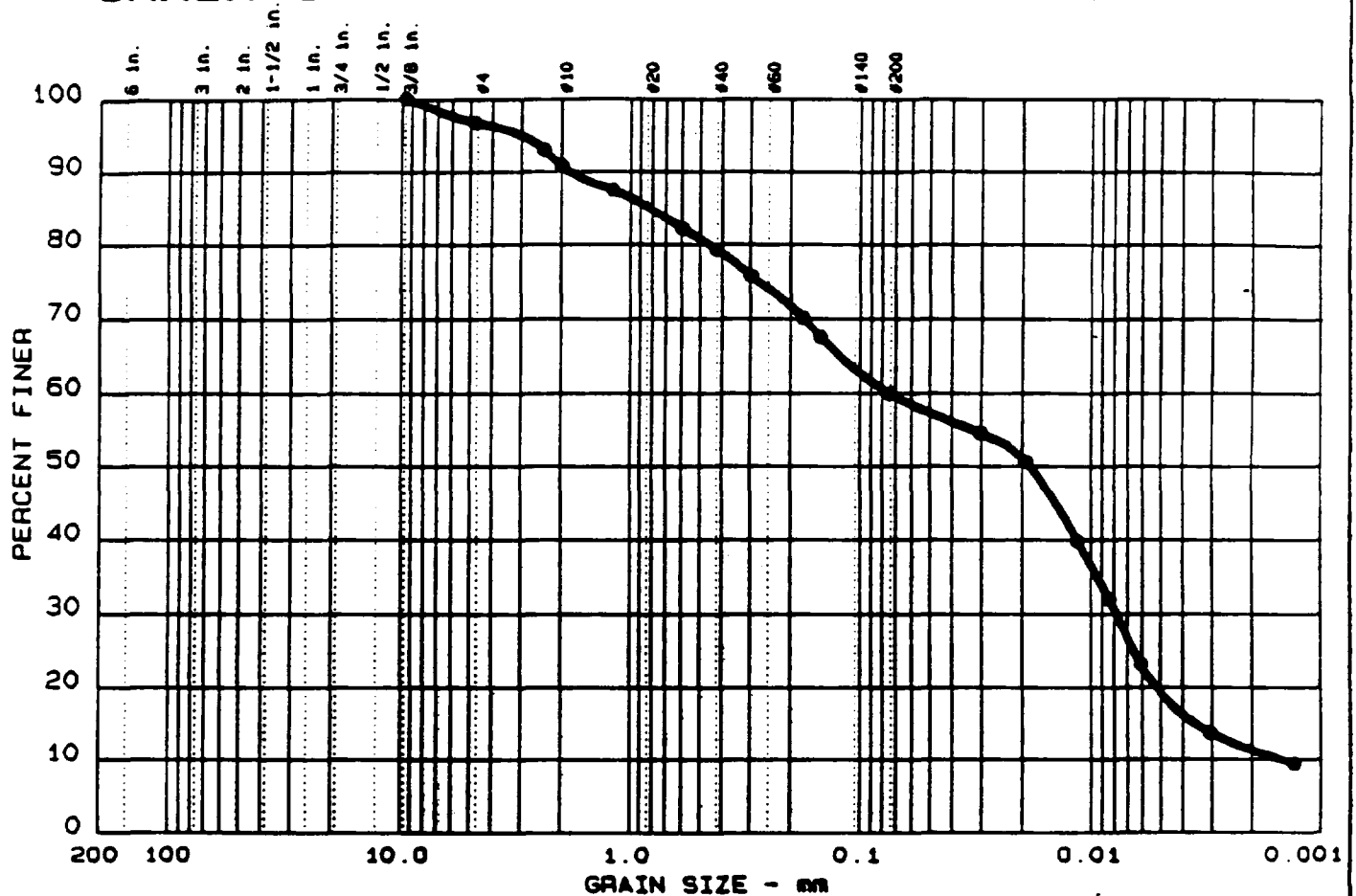
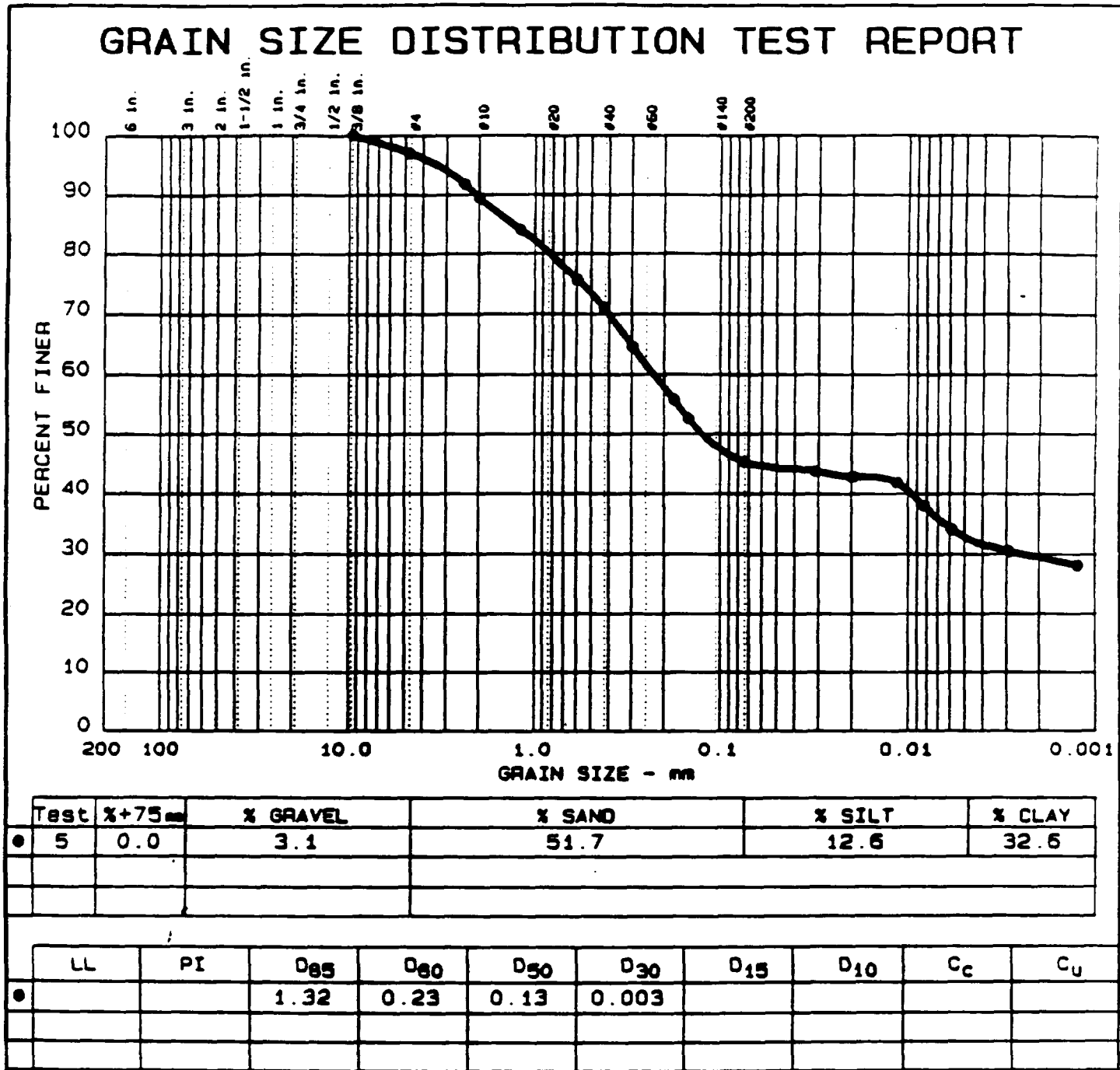


Figure 1.1

Pile B

National Lead Industries, WA # 3476

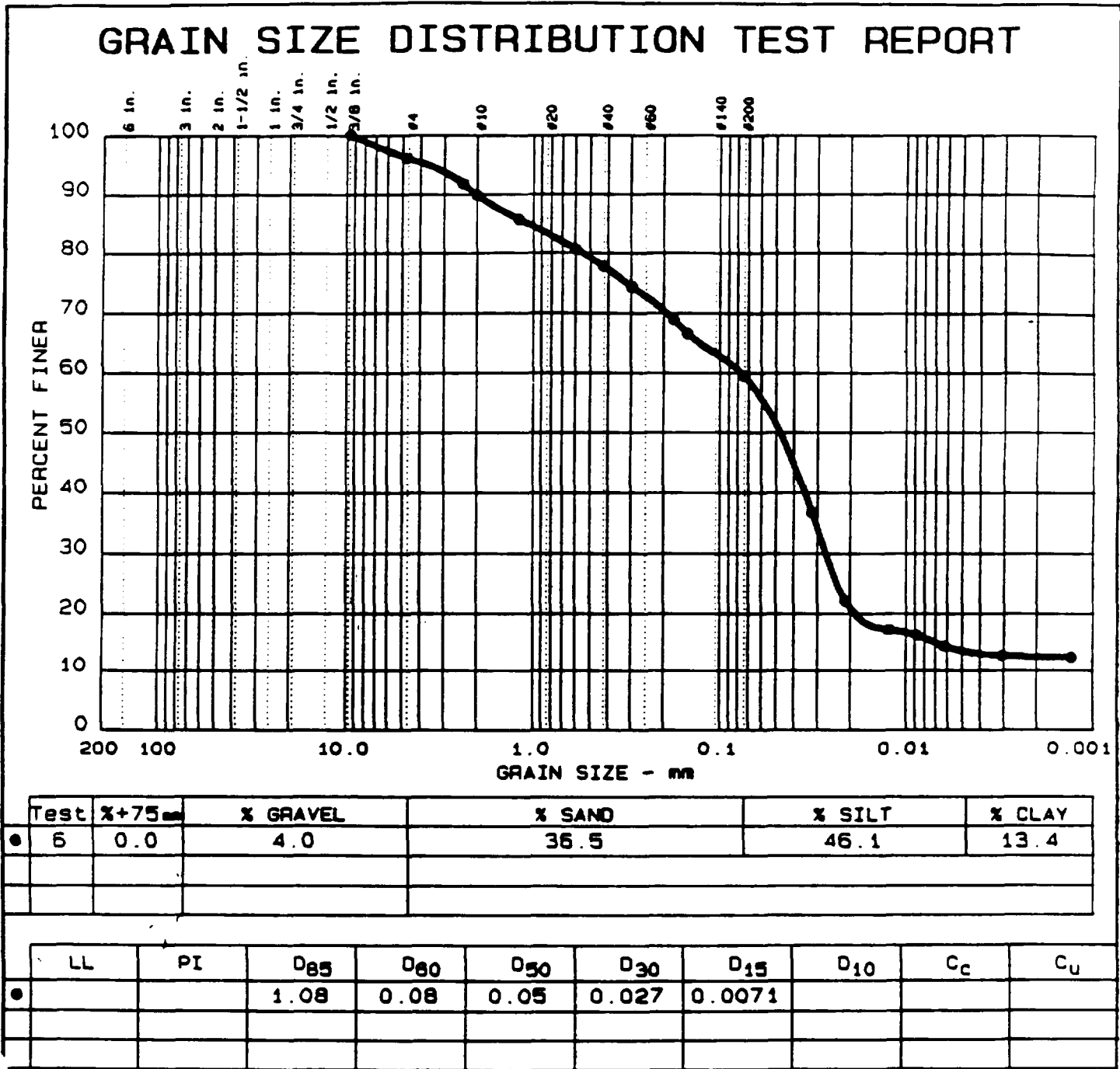


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Figure 1.1

Pile C

National Lead Industries, WA # 3476

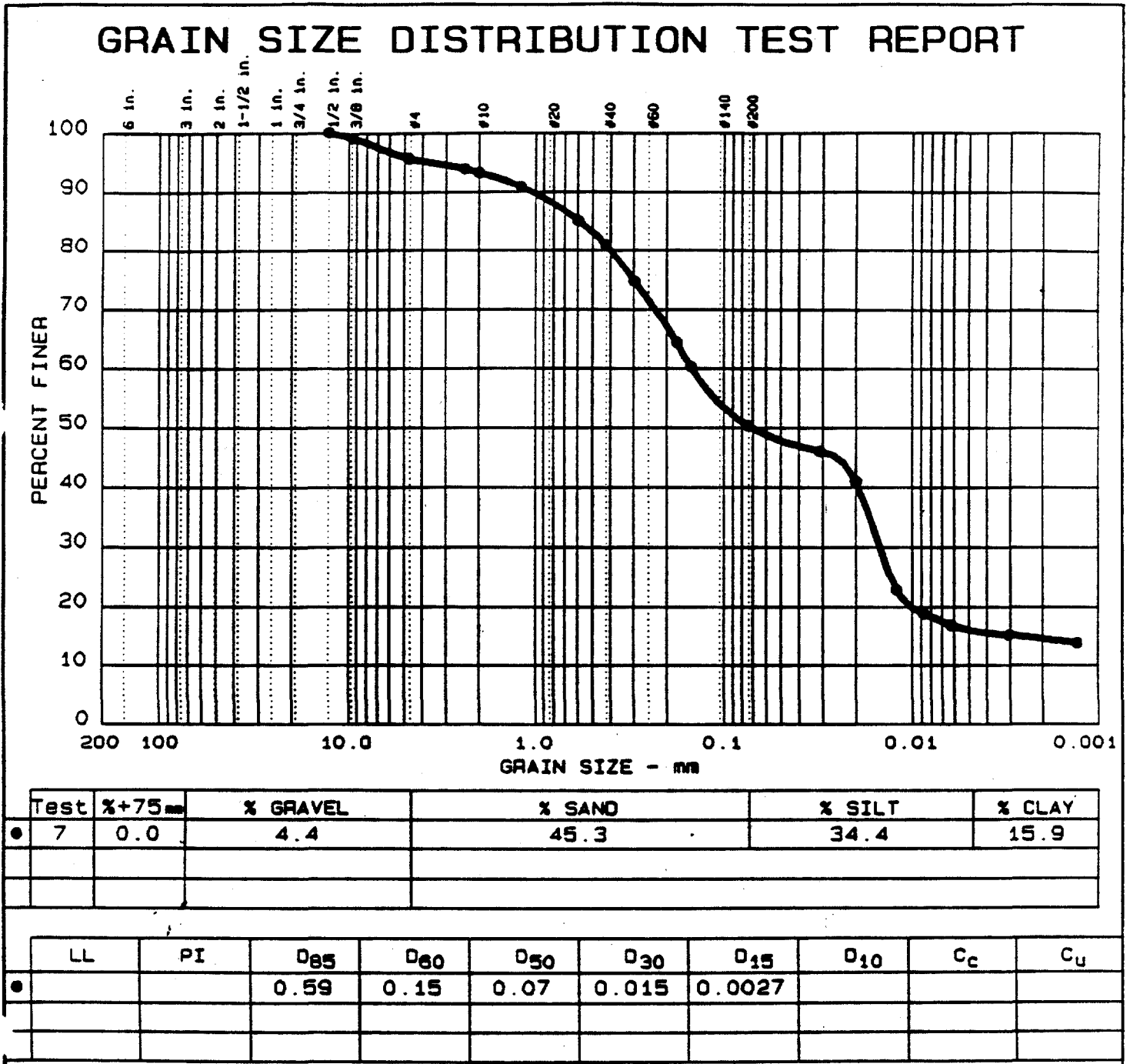


, 00011

Figure 1.1

Pile D

National Lead Industries, WA # 3476



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QA/QC PROCEDURE FOR METALS

EMSL WP 989 #1, WP 186, WP 287, WP 988 ICAP 19, and WP 988 #7 were used to check the accuracy of the calibration curve for the soil analyses. The percent recoveries ranged from 45 to 155 and were within the 95% confidence limits. The results for the EMSL analyses are listed in Table 2.1.

Sample B08797 was chosen for matrix spike/matrix spike duplicate (MS/MSD) analyses for the soil samples. The percent recoveries, listed in Table 2.2, ranged from 6 to 123. The relative percent differences (RPDs), also listed in Table 2.5 ranged from 9 to 96.

The results of the spike blank analysis, associated with the soil samples analyses, are reported in Table 2.3. The percent recoveries ranged from 90 to 114.

Table 2.1

Results of the EMSL for National Lead Ind. Soil Samples

Concentrations reported in ug/L.

METAL	EMSL #	CONC. RECOVERED	TRUE VALUE	95 % CONFIDENCE INTERVAL	% RECOVERY
Aluminum	WP 287	567	500	423-623	113
Antimony	WP 186	31	20	7.87-31.4	155
Arsenic	WP 989 #1	45	50	38.9-60.3	90
Barium	WP 989 #1	111	100	77.1-133.9	111
Cadmium	WP 287	26	25	21.2-27.7	104
Chromium	WP 287	111	100	84.4-115	111
Copper	WP 287	107	100.0	89.4-109	107
Iron	WP 988 ICAP 19	985	1000	N/A	99
Lead	WP 988 ICAP 19	958	1000	N/A	96
Magnesium	WP 988 ICAP 19	967	1000	N/A	97
Manganese	WP 287	99	100	88.4-109	99
Mercury	WP 989 #1	2.0	4.4	1.46-2.58	45
Nickel	WP 287	101	100	84.1-116	101
Selenium	WP 989 #1	53	50	36.1-55.5	106
Silver	WP 988 #7	1048	1000	N/A	105
Zinc	WP 287	105	100	85.9-115	105

N/A - Not available

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Table 2.2

Results of Matrix spike/Matrix spike duplicate Analysis

WA# 3476 NATIONAL LEAD IND. SOIL SAMPLES

Concentration reported in ug/kg

Sample # 808797

METAL	SAMPLE CONC.	ORIGINAL CONC.		RECOVERED CONC.		% RECOVERY		RPD
		Spike	Dup.	Spike	Dup.	Spike	Dup.	
Antimony	1118812	4950	4902	**	**	-	-	-
Arsenic	1619802	4950	4902	**	**	-	-	-
Barium	644950	9901	9804	**	**	-	-	-
Cadmium	47426	99010	98039	157327	145196	111	100	11
Chromium	217327	99010	98039	295347	305392	79	90	13
Copper	2751782	99010	98039	**	**	-	-	-
Lead	118514851	99010	98039	**	**	-	-	-
Manganese	637723	99010	98039	749604	738333	113	103	10
Mercury	97	1109	1077	1264	1422	105	123	16
Nickel	890000	99010	98039	**	**	-	-	-
Selenium	4653	4950	4902	4950	5490	6	17	96*
Silver	5545	99010	98039	69604	75196	65	71	9
Zinc	3472772	99010	98039	**	**	-	-	-

No spike required for aluminum, magnesium, and iron.

** - Not recovered or poor recovery due to higher concentration of analyte in sample

* - poor recoveries due to matrix interference

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Table 2.3

Results of Spike Blank Analysis

WA# 3476 NATIONAL LEAD IND. SOIL SAMPLES

Concentration reported in ug/kg

METAL	Spike Blank	Concentration Recovered	% Spike Recovery
Aluminum	84746	96610	114
Antimony	4237	4153	98
Arsenic	4237	4068	96
Barium	8475	8898	105
Cadmium	84746	81610	96
Chromium	84746	89915	106
Copper	84746	84576	100
Iron	84746	80763	95
Lead	84746	81356	96
Magnesium	84746	87288	103
Manganese	84746	83051	98
Mercury	990	1030	104
Nickel	84746	84746	100
Selenium	4237	4661	110
Silver	84746	87373	103
Zinc	84746	76102	90

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QA/QC FOR TCLP METALS

Sample C8796 was chosen for the matrix spike analysis of the TCLP extracts. The recoveries are listed in Table 2.4. They range from 89 to 101. The recovery separately reported for lead (57 %) was from a different project sample analyzed along with the NL Industries sample batch by the laboratory.

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Table 2.4 MATRIX SPIKE

Project #3476 National Lead Industries

Sample ID: C8796 (NL Ind.)*

Parameter	Spike Added (mg/L)	Sample Conc. (mg/L)	MS Recov. (mg/L)	% Recovery
Arsenic	1.00	ND	1.00	100
Barium	1.00	ND	0.98	98
Cadmium	1.00	5.30	6.00	70
Chromium	1.00	ND	0.97	97
Mercury	1.00	ND	0.97	97
Selenium	1.00	ND	1.01	101
Silver	1.00	ND	0.92	92

ND denotes Not Detected

* The MS analysis for lead was performed on a sample from another site, and is reported below.

Table 2.4 MATRIX SPIKE

Project #3476 National Lead Industries

Sample ID: *

Parameter	Spike Added (mg/L)	Sample Conc. (mg/L)	MS Recov. (mg/L)	% Recovery
Lead	1.00	7.70	8.27	57

ND denotes Not Detected

* The MS analysis for lead was performed on a sample from another site.

00018

Roy F. V ion, Inc.
REAC, Edison, N.J.
EPA Contract 68-03-3482

CHAIN OF CUSTODY RECO /LAB WORK REQUEST

No: 3293

SHEET NO. 1 of 1

Project Name: National Lead Industries
Project Number: 3347-21-01-3476
RFW Contact: Tobica Phone: 632-9200 Due Date: _____

SAMPLE IDENTIFICATION

ANALYSES REQUESTED

Sample No.	Sampling Location	Matrix	Date Collected	Container/Preservative	Metals*				
B8794	Lead oxide A	S	2/19/91	16 oz / None	X				
B8795	Lead oxide B	↓	↓	"	X				
B8796	A Pile	↓	↓	4 oz / None	X				
B8797	B Pile	↓	↓	"	X				
B8798	C Pile	↓	↓	"	X				
B8799	D Pile	↓	↓	"	X				
<p>Note: Return all unused samples in original jars to Rich Tobica</p>									

Matrix:

3- Soil DS- Drum Solids
N- Water DL- Drum Liquids
O- Oil X- Other

Special Instructions:

* As, Ba, Cd, Cr, Pb, Hg, Se, Ag, Zn, Al, Fe, Mg
Cu, Ni, Mn, Sb

Item/Reason	Relinquished By	Received By	Date	Time	Item/Reason	Relinquished By	Received By	Date	Time
6/Analysis	Finis [Signature]	Nawin Howard	2/19/91	5:30					

Roy F. Weston, Inc.
REAC, Edison, N.J.
EPA Contract 68-03-3482

CHAIN OF CUSTODY RECORD/LAB WORK REQUEST

No: 3295

SHEET NO.

Project Name: National Land Industries
Project Number: 3347-21-01-3476
RFW Contact: Tobias Phone: 632-9200 Due Date: _____

Phone: 632-9200 Due Date

9102273

SAMPLE IDENTFICATION

ANALYSES REQUESTED[illegible]

Matrix:

Special instructions:

D samples 18-35 mesh

S- Soil	DS- Drum Solids
W- Water	DL- Drum Liquids
O- Oil	X- Other

[illegible]



REAC PROJECT
GSA RARITAN DEPOT
2890 WOODBRIDGE AVENUE
BLDG. 209 ANNEX
EDISON, NJ 08837-3679

FILE COPY

Galbraith Labs
PO Box 51610
Knoxville, TN 37950-1610

February 19, 1991

Attn: Bill Longmire

RE: Project #3347-21-01-3476
NL Industries

Per your phone quotation of February 13, 1991, please analyze the enclosed samples for the following parameters:

# Samples	Matrix	Analysis/Method
6	Soil	TCLP Metals: As, Ba, Cd, Cr, Pb, Hg, Se, Ag

Please run a set of MS/MSD samples on our sample matrix. Note: as per the enclosed letter, two other samples are being sent to you in this cooler for a separate job. These other samples also require a set of MS/MSD samples to be run on one of the two samples.

A complete extended data package is due at REAC twenty-one working days after receipt of the samples by your laboratory, or on Thursday, March 21, 1991. Please read the attached Weston / REAC / ERT Deliverables Requirements for our exact data package requirements. The Roy F. Weston Bonus/Penalty Clauses have also been attached for your reference.

Preliminary results are expected by FAX as the analyses are completed. We will be contacting you on a weekly basis for information regarding the analyses.

The cost for these analyses shall not exceed \$1632.00 and may be billed against Purchase Order No. 08-70661. Billing is to be directed to Accounts Payable, Barbara Lawrence.

In case of any changes or problems, please contact me at (201) 632-6923.

Thank you.

Chris Schultze
Roy F. Weston, Inc. / REAC Project

000022

NLD 001 0186



REAC PROJECT
GSA RARITAN DEPOT
2890 WOODBRIDGE AVENUE
BLDG 209 ANNEX
EDISON, NJ 08837-3679

File

ATEC Associates
5150 East 65th Street
Indianapolis, IN 46220

February 21, 1990

FAX 317-849-4278

ATTN: Keith Kline

RE: Project #3347-21-01-3476
NL Industries

Dear Keith:

We would like to have the enclosed samples analyzed at your laboratory. Please note that a second set of samples has been enclosed for Grain Size analysis only.

# Samples	Matrix	Analysis	Method	Price
6	soil	Cation Exchange Capacity	SW 846 9080	75.00
6	soil	pH	SW 846 9010	
6	soil	Bulk Density	ASTM C854/E12	30.00
6	soil	Grain Size/Hydrometer	ASTM D422	85.00

We require a blank, as well as one duplicate to be run on one of our samples.

Please sign the enclosed Chain of Custody and return a copy of the signed front page to my attention with the complete data package no later than 21 working days past the date of sample receipt, or March 25, 1991

The Weston / REAC / ERT Deliverables Requirements have been attached for your reference along with the Roy F. Weston Bonus/Penalty Clauses. The cost for these analyses shall not exceed \$1770.00, and may be billed against Purchase Order No. 08-70671. Should any questions or problems arise concerning this project, please call me at (201) 632-6923. Thank you.

Sincerely,

Chris Schultze

Chris Schultze
Roy F. Weston, Inc. / REAC Project

00023

NLD 001 0187



ATEC Environmental Consultants
Division of ATEC Associates, Inc.
5150 East 65th Street
Indianapolis, Indiana 46220-4871
[317] 849-4990. FAX # [317] 849-4278

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Industrial Hygiene / Hazard Communication
Environmental Audits & Permitting
Exploratory Drilling & Monitoring Wells

April 2, 1991

Mr. Chris Schultze
Weston REAC
2890 Woodbridge Ave.
Bld. 209 Annex
Edison, NJ 08832-3679

The enclosed paper is as per the request of Mr. John Hunter. Thank you.

Mr. Richard Gehlbach

00024

Atec Associates

Geotechnical and Materials Engineers

CLIENT _____

PROJECT _____

E NUMBER _____

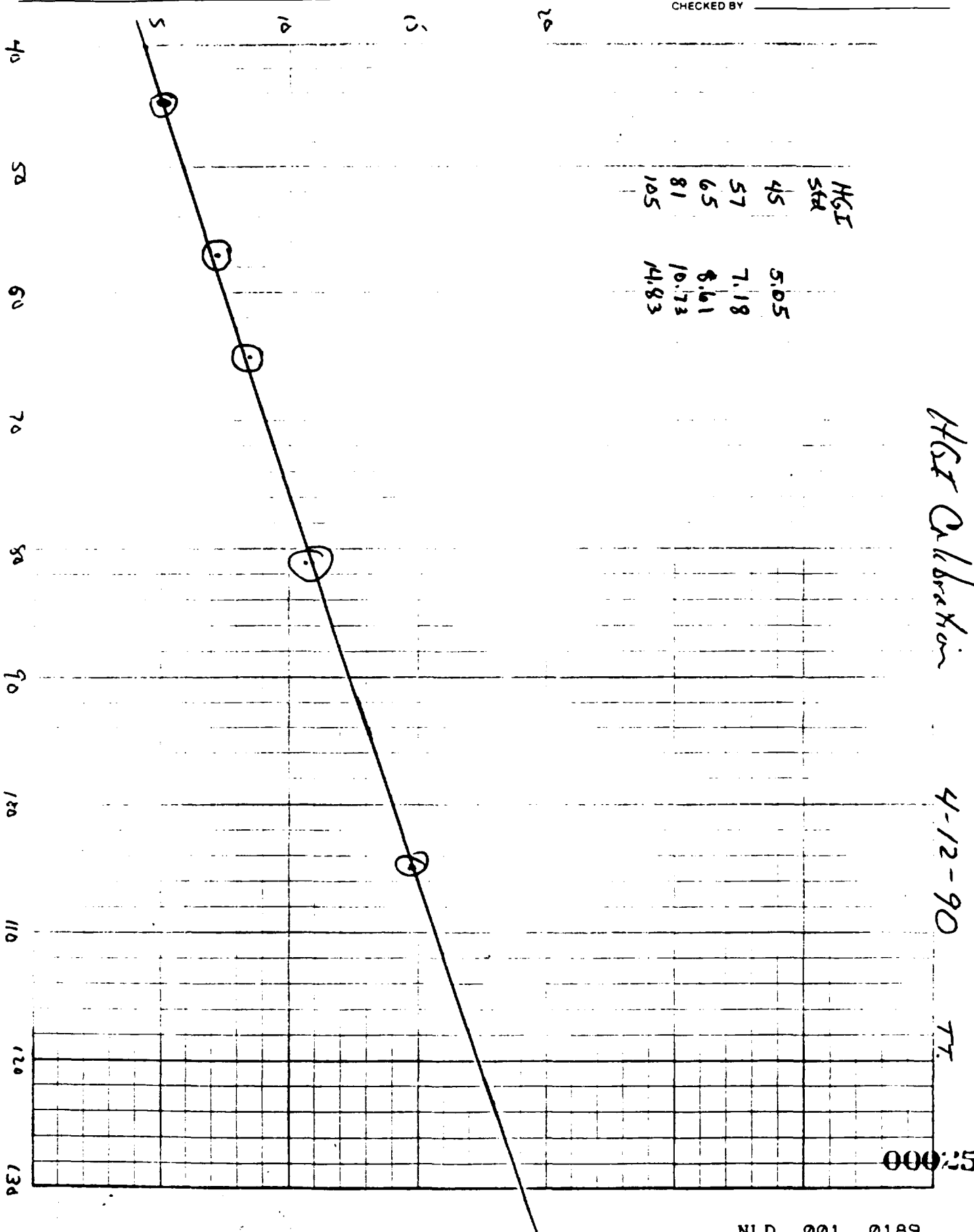
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HGT Calibration

4-12-90

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Co.	Greenbriar Lab	Co.	Roy E. [unclear] [unclear]
Dept.		Phone	9081 765 - 9055
Fax #	(615) 546-7203	Fax #	(615) 765 - 9055

NLD 001 0190

GALBRAITH

Laboratories, Inc.

QUANTITATIVE MICROANALYSES

ORGANIC - INORGANIC

PHONE 615/546-1335 FAX 615/546-7209

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Secretary/Treasurer
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Branch Vice President
GAIL R. HUTCHENS
Executive Vice President
WILLIAM H. LONGMORE
Vice President
Technical Services

***** FAX TRANSMITTAL COVER SHEET *****

DATE May 14, 1991

TO Dr. Yi-hua Lin

Roy F. Weston

FAX # (908) 632-9205

MESSAGE: Response to fax

THANK YOU,

GALBRAITH LABORATORIES, INC.
(FAX # (615) 546-7209)

TOTAL NUMBER OF PAGES INCLUDING COVER LETTER: 1

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Vice President
Technical Services

May 13, 1991

Dr. Yi-hua Lin
Weston REAC Project
GSA Raritan Depot
2880 Woodbridge Avenue

NLD 001 0191

00027

2890 Woodbridge Avenue
Building 209 Annex
Edison, New Jersey 08837-3879

External Page

Dear Dr. Lin:

Your correspondence outlining questions on the analysis of Galbraith sample numbers Q-4807 to Q-4814 (Edgewood and National Lead reanalysis data) has been forwarded to me for action.

A response to each item of concern follows:

1. Q-4814 B is the duplicate of sample Q-4814.
2. Each analyte in matrix spike recovery analyses was added as a 100 microliter aliquot of a stock 1000 microgram/milliliter solution into the 100 ml of leachate.
3. The report of the over-range cadmium spike reading was an oversight. The reanalysis is proceeding and will be sent with accompanying raw data when available.
4. "Peak offset" is a term generated by Perkin-Elmer software whenever no measureable emission peak is present.

During our review of the raw data, we found that the data sheets containing the original weights of sample taken for the leachates had been inadvertently omitted from the raw data mailing. Copies are enclosed. These data are not entered into our database and consequently have no summary sheet.

We apologize for the oversight and hope that no irremedial damage was done. If I can be of any further assistance please do not hesitate to call.

Sincerely,

Robert L. Logan

Robert L. Logan
Director of Quality Assurance

$$\begin{aligned} & (1000 \mu\text{g/ml}) \times .2 \text{ ml} / .2 \text{ L} \\ & 1,000 \mu\text{g/L} \\ & 1,000 \text{ mg/L} \end{aligned}$$

00028

GALBRAITH LABORATORIES, INC.

00029

00030

NLD 001 0194

Open Form 1 INSTRUMENTAL METHODS

Balance: 170-3

Analyst: JBY

PROCEDURE:

PROCEDURE: 1:17/24

INSTRUMENT: 531

DATE: 4/1/91

EXACT COPY OF RAW DATA
FOR RESULTS REPORTED

APR 10 1991

QA MAY 10 1991

Sample #	1430	3131	Q	4801		4808		4809
Estimate	04	07		A		B		C
Sample State								
Cross Wt ()								
Tare Wt ()				113.30		107.56		130.78
Sample Wt (g)				181.07g		100.00		101.00g
Original pH Calibration	3.95B	6.941		8.45		7.24		7.30
1st extraction fluid	4.012	6.997		2000		2000		2000
2nd extraction fluid				4.91		3.88		4.90
> 5000 3.5 ml / 100 ml				✓		✓		✓
40°C 60/100 ml				✓		✓		✓
Readout pH 6.0 RT				4.53		5.11		1.88
< 5 extraction fluid				I				I
> 5 extraction fluid						II		
18 hrs back over	2:50	4/1/91						
4:45	4/12/91							
Results (g/g)				—		—		—
Final pH				7.441		4.907		5.313
1st for analysis				< 2		< 2		< 2
Comments:	2nd fluid 5 = 514g NaOH, 44 ml Acetic / 2000 ml H ₂ O			Calculations:				
1st fluid 1 = 113.30g NaOH, 44 ml Acetic / 2000 ml H ₂ O								

00030-5-5-80 H:00030-5-5-80

000031

NLD 001 0195

Open Form 1 INSTRUMENTAL METHODS

Balance: 170.3

Analyst: JAY

PROCEDURE:

PROCEDURE 1: D/E CV

INSTRUMENT: 531

DATE: 4/11/91 - 4-12-91

EXACT COPY OF RAW DATA

FOR RESULTS REPORTED

APR 19 1991

RAY T D 1991

QA

4-14-91 - 4-17-91

Sample 1	Q	4810		4811		4812		4813		4814
Estimate		B		E		F		A		B
Sample State								12		
Gross Wt ()										
Tare Wt ()		135.31g						116.9		117.23
Sample Wt (g)		101.20g		170.50g		138.67g		121.0		146.0
Calibration		7.90		6.46		8.20		7.29		7.32
Subtraction factor		2000		2000		2000				
Subtraction factor		2.90		4.93		4.88		2.89		4.95
Subtraction factor		✓		✓		✓				
Subtraction factor		✓		✓		✓				
Readout pH/ET		5.01		3.44		4.65		5.147		1.93
Subtraction factor				I		I				I
Subtraction factor								II		
Subtraction factor								4/16/91 2:30 p.m.		
Subtraction factor								4/18/91 8:30-8:30 a.m.		
Readout pH/ET		5.217		5.735		5.978		5.851		5.882
Subtraction factor		<2		<2		<2		<2		<2

Comments:

Calculations:

6.943
4005

NLD 001 0196

GALBRAITH

Laboratories, Inc.

QUANTITATIVE MICROANALYSES

ORGANIC — INORGANIC

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TECHNICAL SERVICES

May 21, 1991

Ms. Chris Schultze
Weston REAC Project
2890 WoodBridge Road
Building 209 Annex
Edison, New Jersey 08837-3679

Dear Ms. Schultze:

The following is in response to your questions posed by Dr. Yihua Lin pertaining to our sample numbers Q-4807 through Q-4814. Please forward to her at your discretion.

1. The Barium result for Q-4814 is a typographical error.
2. The spike matrix for samples Q-4813 (Pb) and Q-4811 (Cd) were miscalculated. Enclosed find the corrected copies of the raw data and a corrected copy of the QC summary.
3. The cadmium result for sample Q-4811 (sample and matrix spike) has been repeated and the raw data is enclosed.

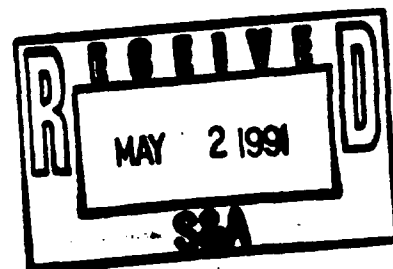
We apologize for any inconvenience these errors may have caused.

If we can be of any other assistance, please do not hesitate to call.

Sincerely,



Ann M. Lescher
Quality Assurance Inspector



00033

DATA VALIDATION

For soil samples analyzed by REAC all QA/QC criteria were met. EMSL calibration curve verification was successfully completed, percent recoveries and relative percent differences for the Matrix spike/Matrix spike Duplicate analysis were all acceptable except for selenium which had low recoveries due to matrix interference. Percent recoveries and relative percent differences for the Blank spike analysis were all acceptable.

TCLP extraction and analysis of extracts was initially completed by the subcontracting laboratory employing single point calibration and the method of standard additions to analyze the extracts. This was deemed unsatisfactory and the extracts were reanalyzed using three point calibration and Inductively Coupled Plasma Emission Spectroscopy, as required by the cited method.

Hardgrove Grindability Index, cation exchange capacity, grain size analysis, pH, and bulk density analysis were all found to be acceptable.